Log Event A

Borehole # 40-09-01

Borehole Information

Farm : S	**Tank :** S-109	**Site Number :** 299-W23-200
N-Coord : 36,072	**W-Coord :** 75,859	**TOC Elevation :** 663.00
Water Level, ft :	**Date Drilled :** 3/31/1976	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 105	

Borehole Notes:
This borehole was drilled in March 1976 to a depth of 105 ft. The borehole was started with a 20-ft length of 8-in. surface casing and completed to a nominal depth of 100 ft using 6-in. casing. The 5 ft of open borehole below the bottom of the 6-in. casing was filled with grout. The 20-ft length of surface casing was then removed and the annulus between the 6-in. casing and the portion of the borehole wall drilled with the 8-in. casing was grouted. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. The drilling record does not mention if the borehole casing was perforated. The top of the casing, which is the zero reference for the SGLS, is approximately flush with the tank farm surface.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number :	1	**Log Run Date :**	07/12/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	54.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	07/15/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	96.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** Y
Finish Depth, ft. :	53.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	3	**Log Run Date :**	07/12/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	65.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	50.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Analysis Information

Analyst : E. Larsen

Data Processing Reference : P-GJPO-1787 Analysis Date : 03/21/1997

Analysis Notes :

This borehole was logged by the SGLS in three log runs. Two log runs were required to log the length of the borehole. A third log run was performed as an additional quality assurance check on a segment of one of the primary log runs.

The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The man-made radionuclide Cs-137 was detected in this borehole. The presence of Cs-137 was detected only at the ground surface with a concentration of 2.6 pCi/g. However, this is not an accurate concentration value because the source-to-detector geometry at the top of the borehole casing differs from source-to-detector geometry used in the calibration.

The KUT log plots show an increase in K-40 concentrations below a depth of 51 ft and a peak in the KUT concentrations at about 60 ft. Increased KUT concentration values generally occur below about 65 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks S-106 and S-109.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

The interval between 50 and 65 ft was relogged. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.